FIRE-PROTECTION SYSTEM, ALLEN COAL MINE, COLORADO FUEL AND IRON CORPORATION, STONEWALL (P. O., WESTON), LAS ANIMAS COUNTY, COLO.

By P. C. van Natter

Information Circular 7852

UNITED STATES DEPARTMENT OF THE INTERIOR
Fred A. Seaton, Secretary
BUREAU OF MINES
Marling J. Ankeny, Director

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by

P. C. van Natter[2/]

SUMMARY

Numerous mine fires have resulted in high death tolls and considerable financial loss during the history of coal mining. In most instances the death toll and financial loss were greater because of inadequate fire-fighting facilities. The information in this report is presented in the hope it may serve as a guide in the selection, placement, and care of fire-protection systems in similar coal mines. The adequacy of fire protection varies according to size of operation, employment, and production.

When fires occur on the surface or underground, measures must be applied quickly to prevent incipient fires from spreading. The record of coal-mine fires shows that, in many instances, facilities for combating fires were very meager or were absent. It would be virtually impossible to establish and maintain all the necessary facilities that may be needed to extinguish widespread mine fires, but it is believed that the coal industry can ill afford less than the minimum required by other industries where the time element and avenues of escape are much more favorable.

The information in this publication describes the fire-protection system at the Allen mine to assist those in the coal-mining industry who are responsible for preventing loss of life in underground operations and for providing fire-fighting facilities at their operations.

REMEMBER, EVERY MINUTE COUNTS FROM THE MOMENT A FIRE STARTS, AND EVERY MINUTE WASTED BECAUSE OF LITTLE OR NO FIRE-FIGHTING EQUIPMENT MAY RESULT IN THE LOSS OF LIFE.

INTRODUCTION

This information circular is based on observation of the fire-fighting facilities at the Allen coal mine, Colorado Fuel and Iron Corporation, Stonewall (P. O., Weston), Las Animas County, Colo., during a routine coal-mine inspection of the mine in December 1957 and later investigation of the system.

The Federal Coal-Mine Safety Act and Federal Mine Safety Code, in common, require that: Each mine shall be provided with suitable fire-fighting equipment, adequate for the size of the mine.

1/ Work on manuscript completed March 19, 1958.

2/ Coal-mine inspector, District H, Bureau of Mines, Denver, Colo.

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Management, in its efforts to provide the best fire protection possible, according to its policy and compliance with the aforementioned requirements, used Information Circular 7662 and the interpretation of section 209(g)(1) of the Federal Coal-Mine Safety Act printed in the Federal Register of March 9, 1957, in providing the fire protection of this mine.

ACKNOWLEDGMENT

The assistance of L. W. Ingles (superintendent, Allen mine), F. S. Leonard (chief company coal-mine inspector), and L. Battiste (chief, surveying department) in preparing this publication is gratefully acknowledged. All photographs were supplied by the Colorado Fuel and Iron Corporation.

DESCRIPTION OF MINE LAYOUT: VENTILATION, HAULAGE AND ELECTRICAL SYSTEM

The mine was opened in March 1951. Its west portals are opened by two slopes, a drift, and a shallow shaft. The east portals, about 2 miles east of the west portals, are opened by two 1,700-foot rock slopes and an airshaft 390 feet in depth. The east and west areas of the mine are interconnected. Normally the mine employs 560 men, with an average daily production of 3,390 tons of coal.

Development is in the Allen seam of the Raton formation. The coal bed averages 66 inches in thickness and dips from approximately 25° at the west portals to 1° at the east portals. The ratio of the volatile to the total combustible matter, which is the index of the explosibility of the coal dust, is shown by:

$$\frac{VM}{VM + FC} = \frac{33.0}{33.0 + 51.0} = 0.39.$$

A room-and-pillar mining method is followed, main entries are driven in sets of 7, and cross entries in sets of 4 and 5; room-and-panel entries are developed in sets of 3 and 4. Crosscuts are 47 to 94 feet apart. The plan of mining provides several avenues of escape in an emergency.

The mine is classed gassy. It is ventilated by means of 2 identical 7-foot axial-flow variable-pitch fans; 1 is installed at the east portal, and 1 at the west portal, both driven electrically and operated exhausting. Approximately 238,000 cubic feet of air a minute returns from the east-portal area and 200,000 cubic feet of air a minute from the west-portal area of the mine.

Haulage is handled by cable-reel shuttle cars; belt, chain, and shaking conveyors; trolley locomotives; and hoist and rope. All coal is loaded into 8-ton-capacity, drop-bottom steel cars. Coal from the east portal area is discharged from the cars into a pocket at the bottom of the slopes and transferred to the surface by a 48-inch-wide belt conveyor; cars of coal from the west-portal area are brought to the surface by hoist and rope from the No. 2 south entries and by trolley locomotives from the No. 1 south sections and discharged onto the mine-run belt conveyor on the tipple.

Electric power is received as 44,000 volts alternating current and reduced by oil-filled transformers to 4,160 and 440 volts alternating current. Rectifiers are used to convert the 4,160 volts alternating current to 250 volts direct current, which is used to operate the shuttle cars and some of the mobile loaders, trolley locomotives, and rock-dusting machines; 440 volts alternating current is used to

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operate all other electric equipment employed underground and on the surface. All underground electric face equipment is of permissible type.

Steel tipples are erected at the east and west portals, and production over each tipple is about equally divided. All surface buildings are of fire-resistant construction.

FIRE-FIGHTING FACILITIES

Water Supply

The water supply for the surface and underground fire-protection system consists of 4 water tanks with capacities of 65,700 gallons each. Two water tanks are situated at the east portals (see fig. 1) and two at the west portals; in addition, there is an auxiliary water tank, with a capacity of 19,200 gallons, at the east portal. The total standing available water supply is 282,000 gallons. The water supply in the tanks is automatically replenished, at the rate of 150 gallons a minute at each location by 2 pumping stations near the Purgatory River, which flows past the mine.

FIGURE 1. - Water Tank, East Portal, Allen Mine.

The water tanks are on hills above the mine portals at elevations of approximately 232 feet above the surface operations and at elevations of 600 feet above the coal bed at the east portals and ranging from 63 feet to 563 feet at the west portals.

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A 4-inch pipeline carries the water from the pumps to the tanks on the hills; all pipelines for the tanks are interconnected.

Surface Fire-Fighting Facilities

Water from the tanks to the hose stations on the surface is delivered through 6- and 4-inch pipelines. All surface-water outlets for hose connections and hydrants are 2 inches in diameter, and all surface and underground fire hose is fitted with 2-inch standard-thread brass connections. Adapters are available at each hose station on the surface to fit the city of Trinidad's 2-1/2-inch fire-fighting equipment. See Fire-Equipment Inspection Report (fig. 2) for the location and number of feet of fire hose at each station, as well as location of fire "plugs" on the surface. (See fig. 3 for a typical fire-hose station on the surface.)

Underground Fire-Fighting Equipment

Most parts of the mine are dry. Water for fire fighting and for suppressing coal dust is piped underground from the surface. It is carried through a 6-inch pipeline from the tanks to the bottom of the 1,700-foot east-portal rock slopes, and 3-inch pipelines carry the water down the west-portal haulage slope and in the No. 1 south entry; 3-inch lines are used from the slopes throughout the mine. The waterlines are installed in the entries paralleling all main and secondary haulage roads, which are connected by open crosscuts. The pipelines extend to all panel belt conveyors and chain- and shaker-conveyor lines. Approximately 35,000 feet of 3-inch pipelines is installed underground for fire-fighting and sprinkling purposes.

Hose taps (connections) are provided in the waterlines along the haulage roads at intervals not exceeding 500 feet. Hose connections are 2 inches in diameter, with standard-thread brass connections; all connections are elevated above the floor level to prevent coal or other substances from getting into the line. Signs showing the location of each hose connection are posted along the haulage roads (see fig. 4).

Three truck-mounted reels equipped with 500 feet of 2-inch hose each are placed at strategic locations in the mine. The fire hose used, is impervious to rot and vermin, neoprene-covered, and tested to withstand 400 pounds pressure per square inch. Each truck is provided with 18 self-rescuers and a toolbox containing miscellaneous tools suitable for fire fighting, such as hammers, axes, shovels, nails, etc. (see fig. 5).

The static water pressure at the water taps is not less than 120 pounds per square inch and does not exceed 160 pounds; a minimum of 175 gallons of water a minute is delivered. Pressure-reducing valves are installed in the waterline where static pressures are excessive.

The fire hose nozzles on the underground hose trucks are 2-inch, reduced to 1/2-inch diameter.

Rock-Dusting Machines

Two high-pressure rock-dusting machines equipped with 500 feet of hose each, used for rock-dusting the mine, are available for fire fighting. A rock-dusting machine is assigned to each of the east- and west-portal areas of the mine (see fig. 6). Supplies of rock dust (25 tons or more each) are provided at advantageous locations along the haulage roads.

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FIRE EQUIPMENT INSPECTION REPORT

WEST PORTAL HOSE STATIONS

	SHOP	WAREHOUSE	UNDER TIPPLE	TOP OF BREAKER	TIPPLE CONTROL PANEL	MIDDLE OF BROKEN COAL BELT GALLERY	
	100'	100'	300'	100'	150'		
HOSE	OK	OK	OK	OK	OK	OK	
CONNECTIONS	OK	OK	OK	OK	OK	OK	
NOZZLE	OK	OK	OK	OK	OK	OK	
HOSE WRENCHES	OK	OK	OK	OK	OK	OK	

WEST PORTAL FIRE PLUGS

	S.E. OF MAIN BLDG.	S.W. OF MAIN BLDG.	CONTROL PANEL (TIPPLE)	TOP OF BREAKER (TIPPLE)	WEST OF COAL POCKET	NORTH OF FAN		
PRESSURE	OK	OK	OK	OK	OK	OK		
CONNECTIONS	OK	OK	OK	OK	OK	OK		

EAST PORTAL HOSE STATIONS

	PROP YARD	SHOP	CRUSHED COAL BELT DRIVE	CRUSHED COAL BELT LINE (3)	BREAKER LEVEL ON TIPPLE	FIRST FLOOR TIPPLE	MAIN BELT DRIVE	MAIN BELT SLOPE			
								1st SLANT	2nd SLANT	3rd SLANT	BOTTOM POCKET
	200'	200'	50'	50'	50'	50'	50'	200'	200'	200'	200'
HOSE	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
CONNECTIONS	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
NOZZLE	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
HOSE WRENCHES	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK

EAST PORTAL FIRE PLUGS

	OIL HOUSE	PROP YARD (2 PLUGS)	S.E. OF MAIN BLDG.	TRACK SLOPE RAMP	FIRST FLOOR TIPPLE	TIPPLE CONTROL PANEL	BROKEN COAL BELT	MAIN BELT (5 PLUGS)	EAST OF BREAKER	EAST OF HOIST
PRESSURE	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
CONNECTIONS	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK

INSPECTED BY: Tony J Cambuzzi DATE Oct 8, 9, 1957 APPROVED L. A. Hughes
SUPERINTENDENT

CC: FSL

FIGURE 2. - Fire-Equipment Inspection Report.

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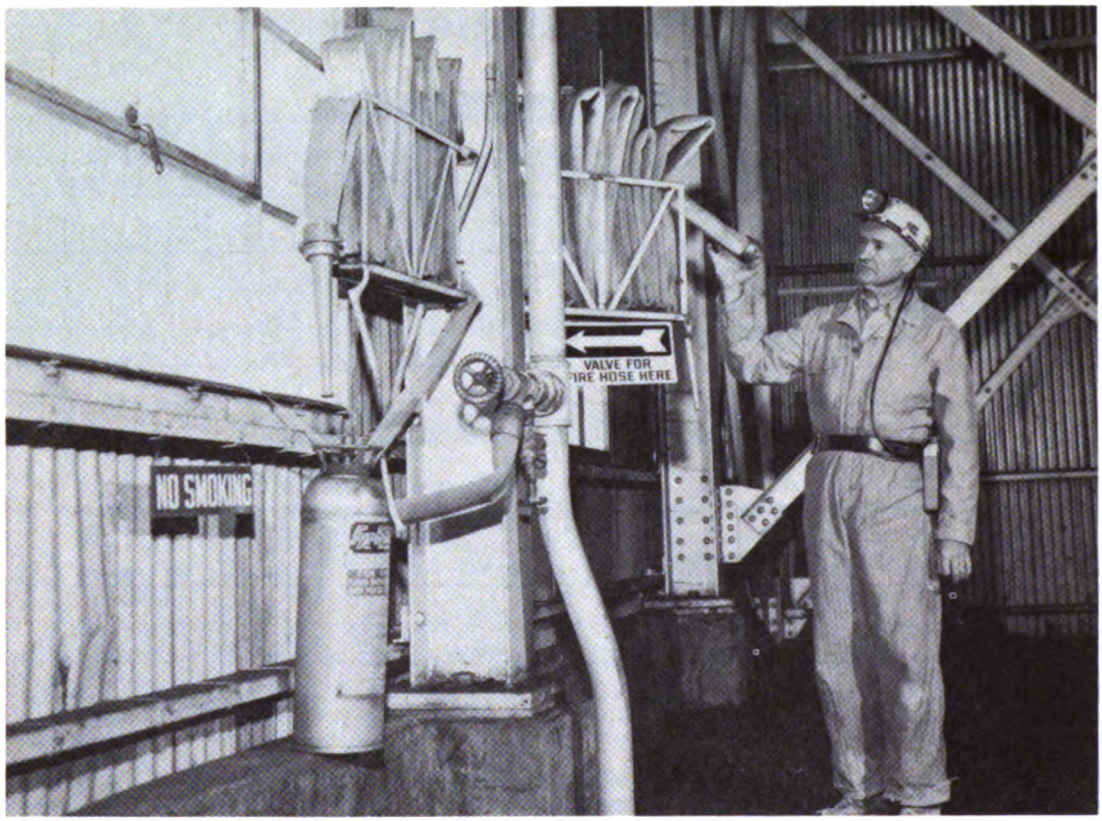

FIGURE 3. - Surface Fire-Hose Station.

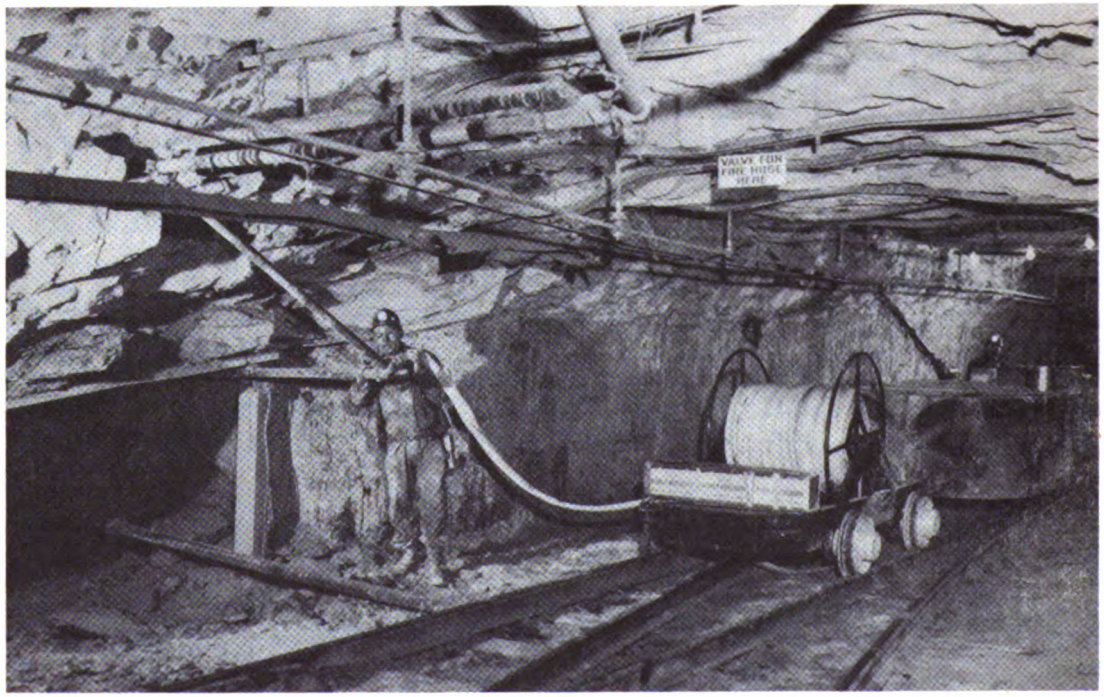

FIGURE 4. - Typical Hose Connections Underground and Truck-Mounted Reel of Fire Hose.

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FIGURE 5. - Truck-Mounted Reel of Fire Hose.

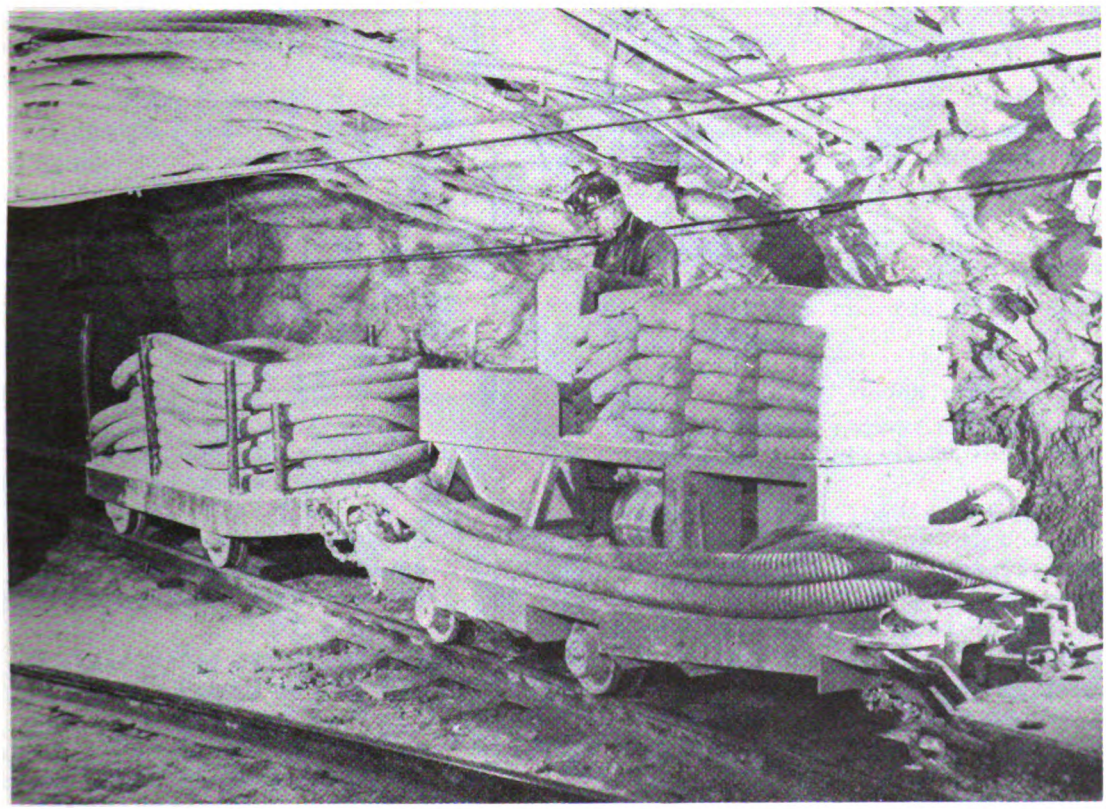

FIGURE 6. - High-Pressure Rock-Dusting Machine.

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The mine is well rock dusted throughout. Analyses of representative dust samples collected during regular coal-mine inspections are consistently above the incombustible requirements of the Colorado Coal Mining Laws and Federal Coal Mine Safety Act.

Fire Extinguishers

Suitable hand-type fire extinguishers are available at or near the surface and underground locations and equipment. Where the number of units appears to be lacking, according to Tabulation of Efficiency Ratings (Information Circular 7662 and Federal Register, March 9, 1957), those units are readily supplemented with other units in adjacent places.

Fire extinguishers are installed as follows:

East Portal Surface

Location	No.	Size and type
Mine office and engineers' office	1	2-1/2-gallon loaded stream.
	1	Do.
Lamphouse	1	4-pound dry chemical.
Changeroom	1	2-1/2-gallon loaded stream.
Main shop	2	Do.
	2	4-pound dry chemical.
Electric shop	1	15-pound carbon dioxide.
Machine shop	1	2-1/2-gallon loaded stream.
Warehouse basement	1	Do.
Boiler room	1	Do.
Oilhouse	1	20-pound dry chemical.
Fanhouse	1	Do.
Main hoisthouse	1	1-1/2-quart carbon tetrachloride.
	1	2-gallon carbon tetrachloride.
Railroad loading house	2	1-1/2-quart carbon tetrachloride.
Drive-end, coal belt	1	2-1/2-gallon loaded stream.
	1	1-1/2-quart carbon tetrachloride.
Along coal belt	4	2-1/2-gallon loaded stream.
Vibrator screen	1	4-pound dry chemical.
Breaker motor	1	1-1/2-quart carbon tetrachloride.
Tipple control room	1	Do.
Tipple control panel	1	2-gallon carbon tetrachloride.
Main-belt pulley	1	2-1/2-gallon loaded stream.
Diesel locomotive	1	1-quart carbon tetrachloride.
Euclid truck	1	Do.
Hydrocrane	1	4-pound dry chemical.

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West Portal Surface

Location	No.	Size and type
Shop	1	2-1/2-gallon loaded stream.
	1	4-pound dry chemical.
	1	15-pound liquid carbon dioxide.
Warehouse	1	2-1/2-gallon loaded stream.
		15-pound liquid carbon dioxide.
Lamphouse	1	2-1/2-gallon loaded stream.
		4-pound dry chemical.
Change room	1	2-1/2-gallon loaded stream.
Boiler room	1	Do.
River pump	1	1-1/2-quart carbon tetrachloride.
Railroad loading house	1	2-1/2-gallon loaded stream.
Along coal belt	4	Do.
Tipple control panel	1	2-gallon carbon tetrachloride.
Breaker motor	1	4-pound dry chemical.
Along mine-run belt	2	2-1/2-gallon loaded stream.
Main hoisthouse	1	2-gallon carbon tetrachloride.
Fanhouse	1	Do.
	1	15-pound liquid carbon dioxide.
Oilhouse	1	2-1/2-gallon loaded stream.
	1	20-pound dry chemical.
Diesel locomotive	1	1-quart carbon tetrachloride.
Euclid truck	1	Do.
Warehouse between portals	2	2-1/2-gallon loaded stream.

East Portal Underground

Pump, 2d panel, 3d south	1	4-pound dry chemical.
Locomotive, 2d panel, 3d south	1	Do.
Pump, 1st panel, 3d north	1	Do.
Mobile compressor, 1st panel, 3d north	1	Do.
Transformer, 1st panel, 3d north	1	1-1/2-quart carbon tetrachloride.
Loader head, 1st panel, 3d north	1	4-pound dry chemical.
Belt tail pulley, 1st panel, 3d north	1	2-1/2-gallon loaded stream.
	1	20-pound dry chemical.
	1	4-pound dry chemical.
	1	1-1/2-quart carbon tetrachloride.
Pump, 1st panel, 3d south	1	4-pound dry chemical.
Rectifier, west slopes	1	15-pound liquid carbon dioxide.
Pump, west slopes	1	4-pound dry chemical.
Compressor, 3d south	1	Do.
Transformer, 3d south	1	Do.
Loader head, 3d south	1	2-1/2-gallon loaded stream.
	1	20-pound dry chemical.
	1	4-pound dry chemical.

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Location	No.	Size and type
Safety circuit breaker, 3d south	1	4-pound dry chemical.
Locomotive, 3d south	1	Do.
Pump, east-slope sidetrack	1	1-1/2-quart carbon tetrachloride.
Pump, No. 5 slope sidetrack	1	4-pound dry chemical.
Pump, west-slope sump	1	Do.
Pump, No. 5 slope, No. 3 entry	1	Do.
Pump, 3d south, No. 2 panel	1	Do.
Pump, near pocket	1	Do.
Pump, No. 3 panel, near pocket	1	Do.
Rectifier, main south	1	Do.
Mine jeep	1	Do.
Pump, east-slopes sump	1	2-1/2-gallon loaded stream.
Transformer, east slopes	1	4-pound dry chemical.
Compressor, east slopes	1	Do.
Hoist, east slopes	1	1-quart carbon tetrachloride.
Loaderhead, 2d panel, east slopes	2	4-pound dry chemical.
Tail pulley, 2d panel, east slopes	1	20-pound dry chemical.
	1	2-1/2-gallon loaded stream.
	2	4-pound dry chemical.
Safety circuit center	1	Do.
No. 2 panel, east slopes pump, No. 2 panel	1	1-quart carbon tetrachloride.
East slopes	1	4-pound dry chemical.
Locomotive, east slopes	1	Do.
Rectifier, main north	1	15-pound liquid carbon dioxide.
Pump, main north	1	4-pound dry chemical.
Compressor, main north	1	Do.
Transformer, main north	1	1-1/2-quart carbon tetrachloride.
Loaderhead, main north	1	2-1/2-gallon loaded stream.
Safety circuit breaker, main north	1	20-pound dry chemical.
	2	4-pound dry chemical.
Locomotive, main north	1	Do.
Pump, No. 1 west sidetrack	1	Do.
Pump, 3d panel, 3d south	1	Do.
Pump, 2d panel, 3d south	1	Do.
Transformer, 2d panel, 3d south	1	Do.
Compressor, 2d panel, 3d south	1	1-1/2-quart carbon tetrachloride.
Charging Station, 2d panel, 3d south	1	4-pound dry chemical.
Belt loaderhead	1	Do.
Belt tail pulley, 2d panel, 3d south	1	2-1/2-gallon loaded stream.
	1	20-pound dry chemical.
	1	4-pound dry chemical.
Safety circuit center, 2d panel, 3d south	1	Do.

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West Portal Underground

Location	No.	Size and type
Rectifier, No. 1 south	1	15-pound liquid carbon dioxide.
Belt discharge, 3d panel, No. 1 south	1	20-pound dry chemical.
	1	4-pound dry chemical.
Belt tail pulley, 3d panel, No. 1 south	1	20-pound dry chemical.
	1	4-pound dry chemical.
Compressor, 4th panel, 1st south	1	Do.
Belt discharge, 4th panel, 1st south	1	Do.
Belt tail pulley, 4th panel, 1st south	1	20-pound dry chemical.
	1	2-1/2-gallon loaded stream.
	1	1-quart carbon tetrachloride.
Transformer, 4th panel, 1st south	1	15-pound liquid carbon dioxide.
Transformer, 5th panel sidetrack	1	4-pound dry chemical.
Locomotive tandem, 1st south	2	Do.
Compressor, 6th panel, 1st south	1	Do.
Belt discharge, 6th panel, 1st south	1	20-pound dry chemical.
	1	4-pound dry chemical.
Belt tail pulley, 6th panel, 1st south	1	20-pound dry chemical.
	1	4-pound dry chemical.
Transformer, 6th panel, 1st south	1	Do.
Pump, 1st south entries	1	1-quart carbon tetrachloride.
Locomotive, 2d south	1	4-pound dry chemical.
Compressor, 3d panel, 2d south	1	1-1/2-quart carbon tetrachloride.
Belt discharge, 3d panel, 2d south	1	4-pound dry chemical.
Belt tail pulley, 3d panel, 2d south	1	2-1/2-gallon loaded stream.
	1	20-pound dry chemical.
	1	1-quart carbon tetrachloride.
Safety circuit center, 3d panel, 2d south	1	4-pound dry chemical.
Transformer, 3d panel, 2d south	1	15-pound carbon dioxide.
Compressor, 4th panel, 2d south	1	4-pound dry chemical.
Belt discharge, 4th panel, 2d south	1	Do.
Belt tail pulley, 4th panel, 2d south	1	20-pound dry chemical.
Safety circuit center, 4th panel, 2d south	1	4-pound dry chemical.
Transformer, 4th panel, 2d south	1	1-1/2-quart carbon tetrachloride.
Rectifier, 4th panel, 2d south	1	15-pound carbon dioxide.
Belt discharge, 2d south	1	2-1/2-gallon loaded stream.
	1	20-pound dry chemical.
Safety circuit center, 2d south	1	4-pound dry chemical.
Compressor, 2d south	1	Do.

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The several vaporizing-liquid (carbon tetrachloride), hand-type fire extinguishers underground are being replaced systematically with either the dry-chemical or carbon dioxide types.

No more than 1 day's supply of lubricants (oils and greases) is stored underground.

BELT CONVEYORS

Belt conveyors are used in all panel-entry development and recovery operations. Where 3 panel entries are driven, the middle entry serves as the belt entry, and where 4 entries are driven the No. 2 entry is used as the belt entry.

The belt entries are isolated from parallel entries by stoppings of incombustible material in the crosscuts on each side of the belt entry. Small 2- by 2-foot metal doors are installed in the stoppings at 400-foot intervals. The doors are installed in the stoppings also at 400-foot intervals. The doors serve as passageways between the beltways and the intake and return airways.

A concrete-block fire stopping is installed at the outby end of each belt entry. Each fire stopping is provided with a metal-door passageway; the space in the stopping above the belt regulates the intake air into the belt entries (see fig. 7). Intake air can be diverted into either end of the belt entries by opening and closing proper regulators (see detail of fire stopping, fig. 8).

Two fire stoppings are installed in the main belt slope, east portal, 1 at the top and 1 near the bottom. The belt slope entry can be sealed immediately in case of a fire by closing the doors in the openings above and below the belt (see fig. 9).

Electric power for the main-slope belt conveyor will cut off automatically in case of overload or if the belt stops from any cause.

A 2-1/2-inch waterline is installed along the full length of the east-slope main belt entry; 2-inch hose connections at 100-foot intervals are provided in the waterline. Each hose connection has 100 feet of 2-inch fire hose and a nozzle.

Two- and 3-inch waterlines, provided with hose taps at 100-foot intervals, are installed along the full length of all panel belt entries. These hose taps are reduced to 3/4-inch-diameter, standard-thread, brass connections; each hose connection is provided with 100 feet of 3/4-inch rubber hose. A sign is posted at each firehose connection along belt entries (see fig. 10).

Twenty-pound dry-chemical and 2-1/2-gallon loaded-stream fire extinguishers are supplied at the tail pulleys of all belt-conveyor lines (see fig. 11). Four-pound, dry-chemical fire extinguishers are placed near the discharge points of all belt conveyors. The hand-type fire extinguishers for the circuit breakers and transformer stations near the panel-entry belt-conveyor loaderheads are also available for electric fires that occur at belt-conveyor loaderheads.

CARE OF FIRE-FIGHTING EQUIPMENT

A systematic fire-protection-equipment inspection program is in effect; all fire-fighting equipment, including waterlines, hose connections, fire hose, nozzles, and hand-type fire extinguishers, is inspected every 3 months. Each hand-type fire extinguisher is provided with a tag to record the date and initials of the person making the inspection; any repair or replacement of defective equipment is made promptly (see figs. 12-14, Fire-Equipment Inspection Reports, covering fire extinguishers).

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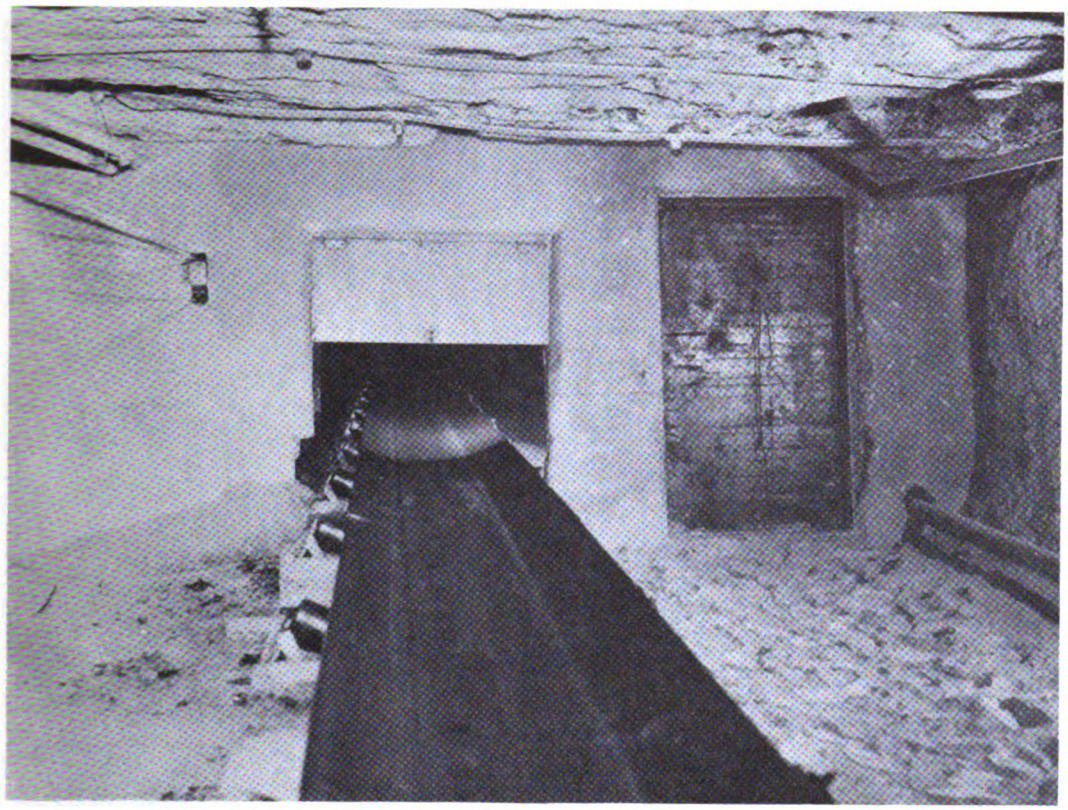

FIGURE 7. - Belt-Entry Fire Stopping.

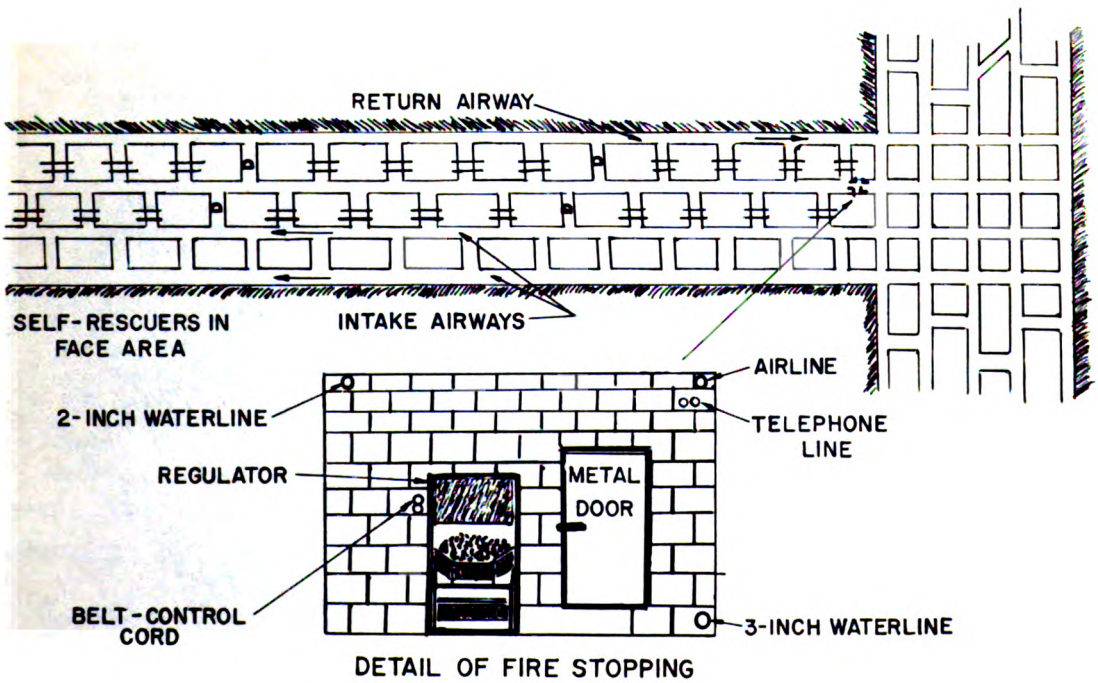

FIGURE 8. - Detail of Fire Stopping.

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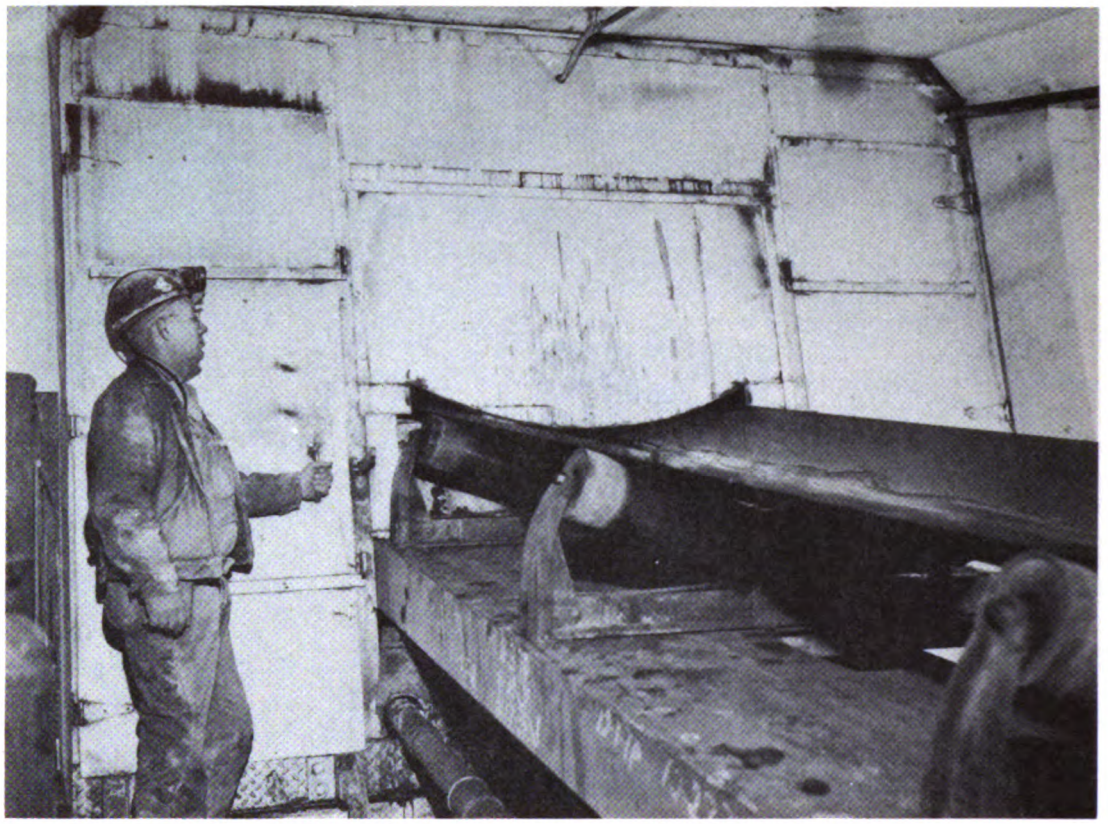

FIGURE 9. - Fire Stopping, East Portal, Main Belt Slope.

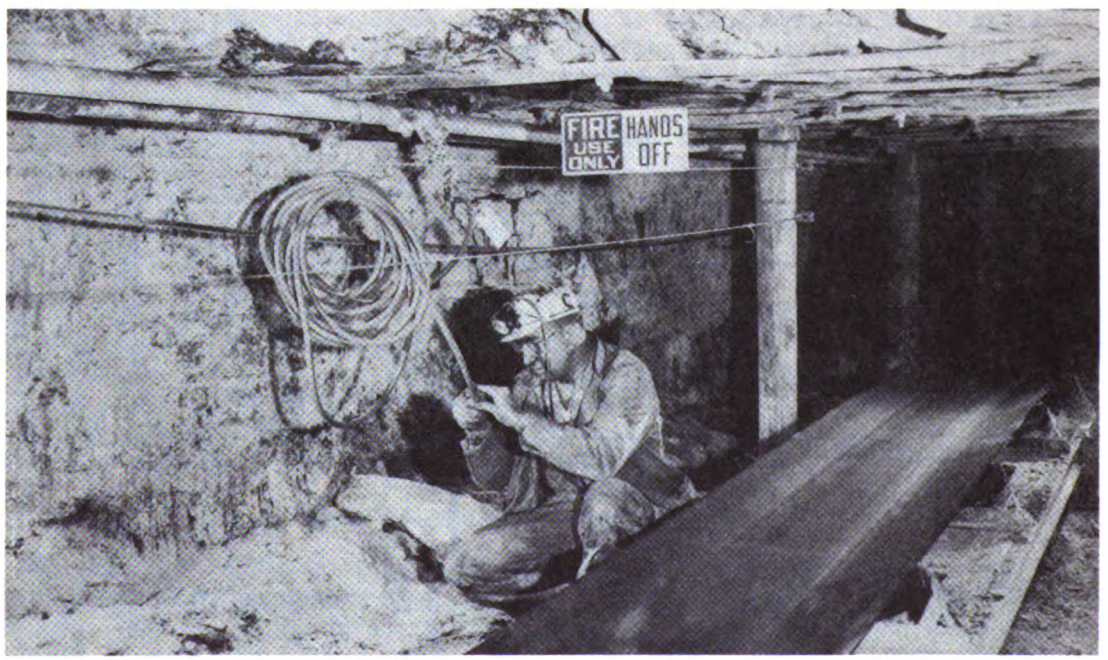

FIGURE 10. - Fire-Hose Station Along Beltline.

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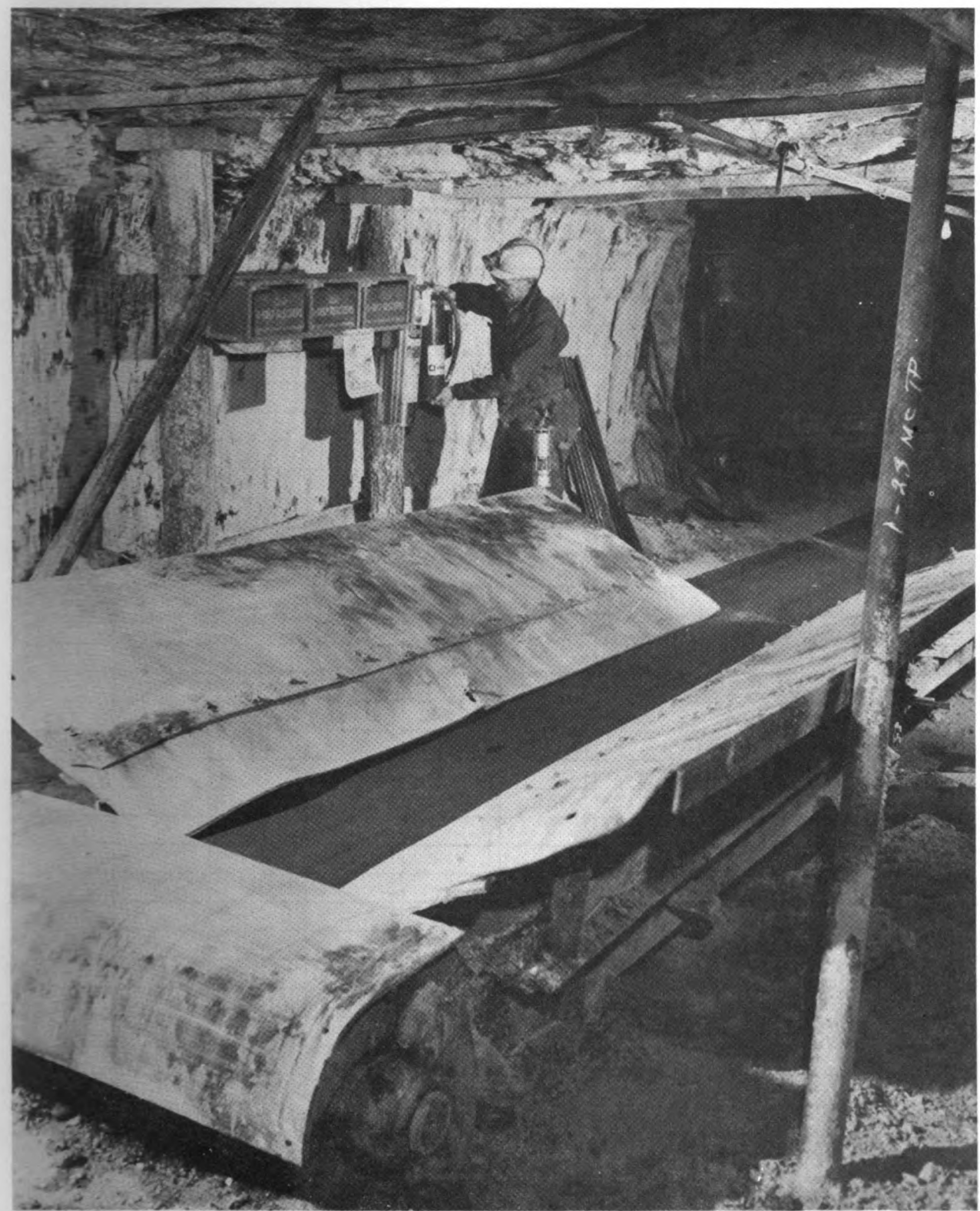

FIGURE 11. - Belt Tail Pulley.

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THE COLORADO FUEL AND IRON CORPORATION - ALLEN MINE PAGE 1

FIRE EQUIPMENT INSPECTION REPORT

EAST PORTAL SURFACE

LOCATION SURFACE TYPE	2½ GAL. FYR FYTER NON-FREEZE		¾ LB. ANSUL DRY CHEM.		1 OR 1½ QT. CARBON TET.		2 GAL. CARBON TET.		KIDDE 15 LB. CO_2		2½ GAL. FOAMITE	
	A-1	B-2	B-2	C-2	B-2	C-2	B-2	C-1	B-1	C-1	A-1	B-1
MINE OFFICE												
ENGINEERS OFFICE												
LAMP HOUSE												
CHANGE ROOM												
MAIN SHOP												
ELECTRIC SHOP												
MACHINE SHOP												
WAREHOUSE BASEMENT												
BOILER ROOM												
OIL HOUSE												
FAN HOUSE												
MAIN HOIST HOUSE												
R.R. LOADING HOUSE												
DRIVE END OF BROKEN COAL BELT ON TIPPLE												
ALONG BROKEN COAL BELT ON TIPPLE												
VIBRATOR SCREEN												
BREAKER MOTOR												
TIPPLE CONTROL ROOM												
TIPPLE CONTROL PANEL												
MAIN BELT PULLEY												
DIESEL LOCOMOTIVE												
EUCLID TRUCK												
HYDROCRANE												

INSPECTED BY _____ DATE _____ APPROVED _____
SUPERINTENDENT

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FIGURE 12. - Fire-Equipment Inspection Report (East Portal Surface).

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THE COLORADO FUEL AND IRON CORPORATION - ALLEN MINE PAGE 2

FIRE EQUIPMENT INSPECTION REPORT

WEST PORTAL SURFACE

LOCATION SURFACE TYPE	2½ GAL. FYR FYTER NON-FREEZE A-1 B-2	¼ LB. ANSUL DRY CHEM. B-2 C-2	1 OR 1½ QT. CARBON TET. B-2 C-2	2 GAL. CARBON TET. B-2 C-1	KIDDE 15 LB. CO_2 B-1 C-1	2½ GAL. FOAMITE A-1 B-1
SHOP						
WAREHOUSE						
LAMP HOUSE						
CHANGE ROOM						
BOILER ROOM						
RIVER PUMP						
R.R. LOADING HOUSE						
ALONG BROKEN COAL BELT ON TIPPLE						
TIPPLE CONTROL PANEL						
BREAKER MOTOR						
ALONG MINE RUN BELT ON TIPPLE						
MAIN HOIST HOUSE						
FAN HOUSE						
OIL HOUSE						
DIESEL LOCOMOTIVE						
EUCLID TRUCK						

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FIGURE 13. - Fire-Equipment Inspection Report (West Portal Surface).

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THE COLORADO FUEL AND IRON CORPORATION - ALLEN MINE PAGE 3

FIRE EQUIPMENT INSPECTION REPORT

EAST PORTAL UNDERGROUND

LOCATION MAIN SLOPE TYPE	2½ GAL. FYR FYTER NON-FREEZE A-1 B-2	¼ LB. ANSUL DRY CHEM. B-2 C-2	1 OR 1½ QT. CARBON TET. B-2 C-2	2 GAL. CARBON TET. B-2 C-1	KIDDE 15 LB. CO_2 B-1 C-1	2½ GAL. FOAMITE A-1 B-1
MAIN BELT SLOPE						
WEIMAN PUMP, BOTTOM OF POCKET						
SHOCK BELT						
BOTTOM POCKET CONTROL PANEL						
TOP POCKET ELECTRIC PANEL						
SLOPE BOTTOM LOCOMOTIVE						
DUMP POCKET TRANSFORMER						
ALLIS CHALMERS & DEAN HILL PUMPS						

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FIGURE 14. - Fire-Equipment Inspection Report (East Portal Underground).

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A map of the mine is maintained, showing locations of waterlines, fire-hose truck stations, fire-hose connections in the waterlines along the haulage roads and belt-conveyor lines, high-pressure rock-dusting-machine station, rock-dusting machines used in face areas, rock-dust supplies, and hand-type fire extinguishers. A well-equipped mine rescue station is maintained at the mine (see fig. 15); 5 mine rescue teams of 5 men each at this mine and at the company Frederick mine nearby are trained periodically.

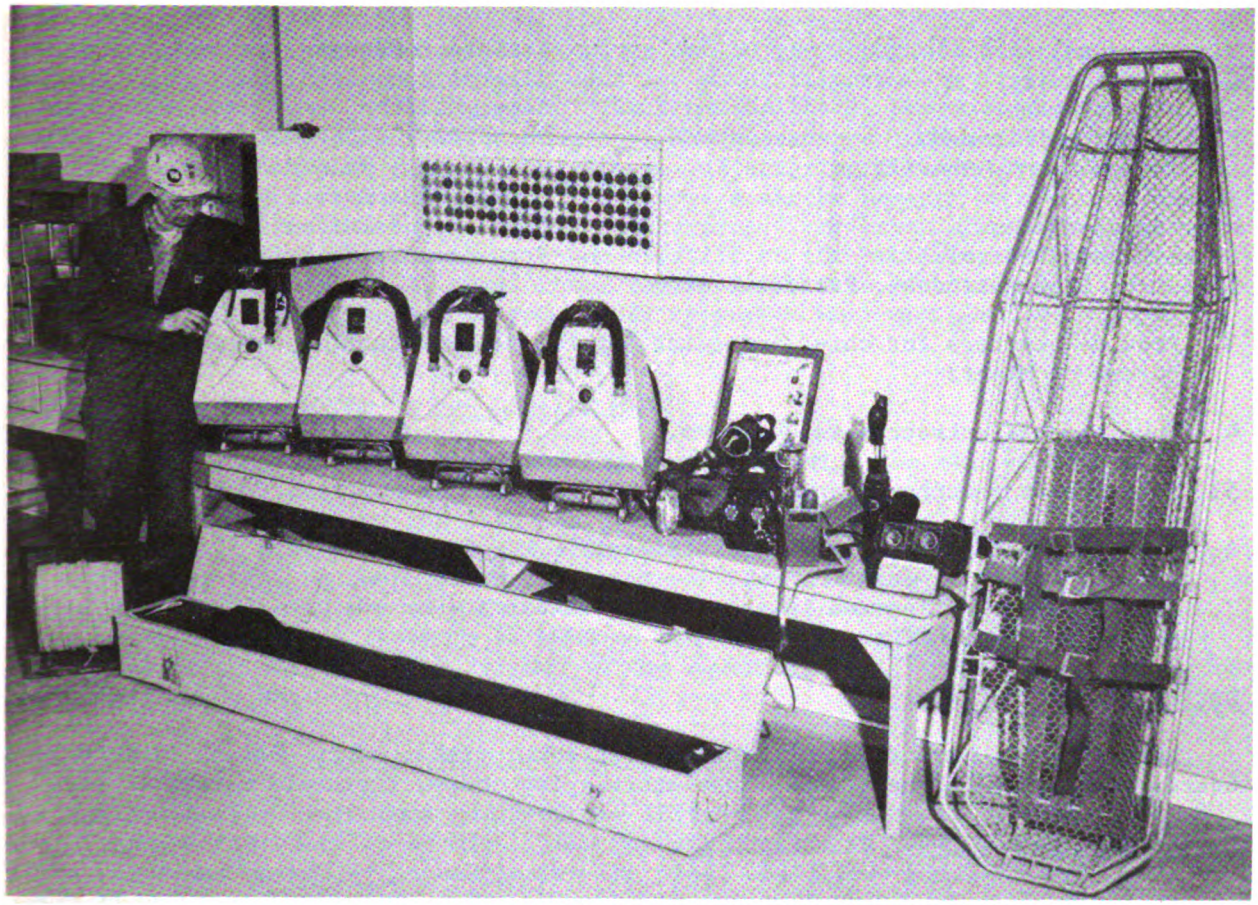

FIGURE 15. - Mine Rescue Equipment and Supply.

FIRE-FIGHTING ORGANIZATION

A plan to be followed in case of fire or explosion is in possession of each underground foreman and assistant foreman, and each surface official; copies of the plan include a map showing the location of underground fire-fighting facilities (see attached map). The plan in effect at the mine follows:

Allen Mine
Mine Rescue and Recovery Organization

Duties of Mine Superintendent

1. Notify the following in case of mine fire or explosion:

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Manager, Mining Department.
Chief Engineer.
District State Mines Inspector.
District Supervisor, U. S. Bureau of Mines
Company Mine Inspector.
Frederick-Mine Engineer.
Chief Mine Clerk.
General Superintendent, Coal Mines.
General Mine Foreman.
Chief State Mine Inspector.
Federal Mine Inspector
Chief Electrician.
Allen-Mine Engineer.
Company Physician.

2. Also notify the following, as necessary:

Mine Foreman.
Master Mechanic.
Surface Foreman.
Fire Chief - Trinidad.
Las Animas County Sheriff.
Nurses.
Mine Rescue Teams.
State Highway Patrol.
Assistant Superintendent, Frederick Mine.
Assistant Foreman.
Electrician.
Supply Clerk
Construction Foreman.
Red Cross - Trinidad, Colo.
Company Chemist.
Ambulance Service.
Superintendent, Frederick mine.

3. Provide quarters for chief inspector, district inspectors, and men from the Bureau of Mines.

4. Rope off all entrances to the mine.

5. Keep men at telephones and at fans.

6. Provide quarters for doctors and nurses.

7. Assign men to duties and issue aluminum checks to men who are authorized to enter the roped-off area.

Duties of Supply Clerk

Provide nails, brattice cloth, hatchets, axes, picks, saws, shovels, safety lamps, boards, props, telephones, wire, insulators, pipe, hose, first-aid material, etc.

Duties of Electrician

Pull all electrical switches entering the mine when authorized to do so by the superintendent or those in charge. If no damage is done to the mine ventilating fans, and they continue to operate, keep them in operation until authorized to do otherwise by those in charge. If the fans or other equipment is damaged and not operating, the necessary repairs should be made as quickly as possible for proper operation of the fans, but they should only be put in operation when authorized by the official in charge.

Keep an attendant at the fan and provide for carrying telephone lines from the fan to headquarters, and from the fan to the base of operation in the mine, and from the mine to headquarters; provide attendants for each phone.

If it is a local explosion or fire, all power switches to that section of the mine shall be pulled immediately by the first person to reach those points; it shall be the duty of the electrician to check and see that this is done.

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Duties of Outside Foreman

Provide a messroom, provisions, commissary, morgue, restroom, sleeping quarters, hospital, blankets, stretchers, first-aid material, etc.

Duties of Checkmen, Group 1, Men Entering Mine

No one shall be allowed to enter the mine unless vouched for by the superintendent; each person must also have a brass check with a number on it.

Upon presenting the aluminum check given out by the superintendent, or person designated by him, checkmen will give each one about to enter the mine, a brass numbered check to carry in his pocket. The aluminum check, corresponding to the number of his brass check, will be hung on a checkboard provided for that purpose. The check number, the man's name, and the time of entering the mine will be recorded in a book provided for that purpose. The aluminum checks hanging on the board will indicate at all times the number of men in the mine. The brass checks hanging on the board will indicate the number of men offshift on the outside. All men, except the inspectors and officials, shall enter the mine in crews of 5 men each (1 of whom shall be an official in charge or some other competent man) and shall be willing to perform any duties assigned to them.

Duties of Checkmen, Group 1, Men Leaving Mine

Each man's check number, name, and the time of leaving the mine should be recorded in the book provided for that purpose. The brass checks should be collected and hung on the checkboard and each man given his aluminum check upon leaving the mine. This will give the men at all times a check in their possession. Only those holding checks will be admitted to the commissary and sleeping quarters; clothing and supplies will be given only to holders of aluminum checks, accompanies with an order made in duplicate (copy to be kept in the office, original copy to go to the store manager or supply clerk), signed by the superintendent, chief clerk, or anyone authorized to do so.

Duties of Check Men at Other Openings Not Main Entrance

Notify the superintendent that you are leaving for opening assigned to you, if not already notified to go by him. Take names, check, time of leaving mine, and place where men worked if anyone leaves the mine, and allow no one to enter unless ordered to do so by those in charge.

Duties of Checkmen, Group 2, Men Entering Mine

The men passed by checkmen, Group 1, pass on to checkmen, Group 2; it will be their duty to:

Examine carefully each safety lamp, without exception, and permit no one to enter the mine with a safety lamp unless qualified to handle it. Only the Federal Coal-Mine Inspector, State Mine Inspector, Mine Foreman, and one in charge of crews shall have a flame safety lamp.

Examine each man carefully, without exception, for smoking articles or combustible material, and allow no one to enter who has them on his person. This examination consists of going through each pocket or any other place of concealment.

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Duties of Checkmen, Group 2, Men Leaving Mine

Collect flame safety lamps and permissible cap lamps and return them to the lamphouse. The men will then pass on to Group 1.

Duties of Company Inspector

Report at headquarters to discuss procedure in recovery work and arrangement of shifts and cooperate with the State Mine Inspector and others in recovery operations. Arrange crews for each shift, and post names of men engaged on each. One man is to be at rescue headquarters at all times to check men in and out, arrange crews, and take care of apparatus and equipment; immediately after apparatus has been used, he will see that all oxygen cylinders are recharged, mouthpieces sterilized, and apparatus masks and other parts inspected, that each man places masks and apparatus in the proper place, and that (in checking men in and out of the mine) each man's record includes the number of the apparatus and the hours used under oxygen. If gas masks are used and if the canister was not used the full time, the actual time used should be marked on the canister. Assign sleeping quarters for apparatus men.

Duties of Fire Chief

Allow only authorized persons in roped-off areas. Assemble at once all available fire-fighting apparatus, such as fire extinguishers, chemical tanks, hose nipples, reducers, wrenches, and nozzles, etc.

Duties of Las Animas County Sheriff

Allow only authorized persons showing aluminum checks or brass checks inside roped-off areas; assist checking in and out of the mine and roping of entrances.

Duties of Chief Engineer and Assistants

See that a man is in the office at all times. Provide maps showing the regular course of air, stoppings, regulators, overcasts, and doors; also have maps of adjoining mines, if workings are near or connected. Make prints with advances as shown on the map on the outside, that is, kept up-to-date; also show location of pumps, waterlines, substations, and fire-fighting equipment.

Duties of Chemist

Arrange to have air samples taken, and analyze them.

Duties of Doctors and Nurses

Company doctor: Supervise and arrange for additional doctors and nurses, provide for and look after the temporary hospital, which includes beds, medicines, and other necessary material.

Duties of State Mine Inspector

A mine fire or recovery work after a mine explosion is always in charge of the chief of the coal-mine-inspection department, district mine inspectors, and officials of the company.

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Duties of Person in Charge of Shifts

He should report the progress made by his shift to the superintendent, State mine inspector, and the person in charge of the next shift, who relieves him as soon as he comes off shift. Notations should be made on all maps of stoppings, overcasts, etc., constructed, where bodies were found, or any other information necessary for the safety and progress of the recovery work.

Equipment and Personnel Available for Handling a Mine Fire or Explosion

1. Special brass checks, each numbered from 1 to 100 with "Mine Rescue Worker" stamped on them are kept in a closed box stored in the rescue room. Aluminum checks, with corresponding data, are in a closed checkboard on the wall of the rescue room.

2. List of apparatus, masks, and other equipment:

10 self-contained oxygen breathing apparatus with accessories.
5 All-Service gas masks with accessories.
1 hand operated, high-pressure oxygen pump.
9 permissible flashlights (in gray-metal box).
Large box, first-aid supplies.
2 Army stretchers.
1 Navy stretcher.
5 extra oxygen cylinders, fully charged.
Various and essential miscellaneous parts.

Additional Parts Available From Parts Kit at Frederick Mine

Complete oxygen breathing apparatus units are available from the company Frederick mine nearby.

INT.-BU.OF MINES,PGH.,PA. 9356

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